202301UECM2453OE3b

Start again

Review of preview

Started on	Saturday, 1 April 2023, 10:30 PM
Completed on	Saturday, 1 April 2023, 10:30 PM
Time taken	9 secs
Marks	0/8
Grade	**0** out of a maximum of 10 (**0**%)

1

Marks: 1

A 1-year European euro-denominated put option for $100 with strike price of € 0.81/$1 has a premium of €1.5. You are given:

- The continuously compounded risk-free interest rate for dollars is 0.057.
- The continuously compounded risk-free interest rate for euros is 0.024.
- The current exchange rate € 0.83/$1.

Calculate the price of a dollar-denominated put option allowing the sale of €100 for $123.457. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 1.191767
Marks for this submission: 0/1.

2

Marks: 1

Let $ denote the Australian dollars. Suppose the (spot) exchange rate is £0.43/$, the pound-denominated continuously compounded interest rate is 0.079,the dollar-denominated continuously compounded interest rate is 0.057, and the price of 1-year £0.41-strike pound-denominated European put on the dollar is £0.015. What is the price of a dollar-denominated pounds _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.240058
Marks for this submission: 0/1.

3

Marks: 1

Let S(t) be the time-t price of stock S and Q(t) be the time-t price of stock Q. These prices satistfy the following stochastic differential equation in the risk-neutral measure:

$$dS(t)/S(t) = 0.039dt+0.15dZ(t)$$
$$dQ(t)/Q(t) = 0.02dt+0.27dZ'(t)$$

Z(t) and Z'(t) are standard Brownian motions in the risk-neutral measure that satisfy:

$$Z(t) = W_1(t)$$
$$Z'(t) = 0.71W_1t + 0.61W_2t$$

where $W_1(t)$ and $W_2(t)$ are independent standard Brownian motions. You are given:

- S(0) = 60 and Q(0) = 120
- The continuously compounded risk-free interest rate is 0.06.

A European exchange option allows the purchaser to exchange 2 shares of S for one share of Q at the end of one year. Calculate the value of this option. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 7.7425
Marks for this submission: 0/1.

4
Marks: 1

Consider a model with two stocks. Each stock pays dividends continuously at a rate proportional to its price. $S_j(t)$ denotes the price of one share of stock j at time t. Consider a claim maturing at time 3. The payoff of the claim is max[$S_1(3)$, $S_2(3)$]. You are given:

- $S_1(0) = 157$
- $S_2(0) = 314$
- Stock 1 pays dividends of amount $0.056S_1(t)dt$ between time t and time t+dt.
- Stock 2 pays dividends of amount $0.112S_2(t)dt$ between time t and time t+dt.
- The price of a European option to exchange Stock 2 for Stock 1 at time 3 is 12.

Calculate the price of the claim. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 236.3917
Marks for this submission: 0/1.

5
Marks: 1

Assume the Black-Scholes framework for a stock whose time-t price is S(t). You are given:

- S(0) = 100
- S pays dividends of amount $0.039S_1(t)dt$ between time-t and time t+dt.
- V[ln S(t)] = 0.062t
- The continuously compounded risk-free interest rate is 0.095.

Compute the price of min(S(0.5),107) that mature at time 0.5. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 93.0972
Marks for this submission: 0/1.

6
Marks: 1

For a stock in the Black-Scholes framework, the price at time-t is S(t). You are given:

- S(0) = 58
- $\sigma = 0.37$
- The stock pays no dividends.
- The continuously compounded risk-free interest rate is 0.04.

A gap call option pays $c[S(t)]^{0.5}$ - 58 is the price of the stock is greater than 69.6 at time 1. Determine the value of c which makes the price of this option zero. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 6.1333
Marks for this submission: 0/1.

7
Marks: 1

Let S(t) denote the price at time t of a stock. Consider a 8-month European gap option. If the stock price after 8-month is less than 28, the payoff is 28.5 - S(8/12); otherwise, the payoff is zero. You are given:

- S(0) = 30.
- The stock will pay a dividend of amount 4 after 4-months. This is the only dividend that will be paid before the gap option expires.
- The prepaid forward price of the stock follows a geometric Brownian motion with a volatility of 35%.
- The continuously compounded risk-free rate of interest is 10%.

Calculate the price of the gap option. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 3.2055
Marks for this submission: 0/1.

8

Marks: 1

Assume the Black-Scholes framework. Let S(t) denote the price at time t of a nondividend-paying stock. You are given:

- S(0) = 60.
- σ = 0.22.
- r = 0.06

A market-maker sells a 1-year European gap put option with trigger 53.0 and strike price 67.0. Calculate the number of shares of stock needed to delta-hedge this option. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: -0.47713
Marks for this submission: 0/1.